MERCURY STORAGE AND TRANSFER PROGRAM

Mercury Training Overview

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Introduction

Mercury Training

- We are here for……

- Compliance Training
  - *Compliance Overview*
  - *Process Overview*
  - *Chemical Accident Prevention Program Elements*
  - *An overview of relevant CAPP-specific operating procedures*
  - *Mercury storage concept of operations/layout*
  - *The location of equipment and instrumentation*
  - *Specific health and safety aspects for Mercury*
  - *Emergency Operations and Emergency Shut down*
  - *Safe Work Practices of Mercury and support activities applicable to the job task*
  - *Management of Change(s) to any processes relating to Mercury*
  - *Verify that Employees Understand Training*

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Compliance Overview

Mercury Training

- This training addresses the Nevada Division of Environmental Protection (NDEP) Chemical Accident Prevention Program (CAPP) regulations which require compliance with the Nevada Administrative Code (NAC) 459.95418. and its purpose is provide a trained, efficient, informed and safe workforce for the accomplishment of Mercury Transfer within the scope of the Mobile Mercury Transfer System (MMTS) and the degree of support that SOC's personnel will be required to provide.

- This is required training for personnel directly involved in support activities related to the MMTS and any hazards associated and tasks involving the storage or internal movement of elemental mercury for the purposes of repackaging, inspection and systems maintenance of containerized elemental mercury and the carbon dioxide (CO_2) fire suppression systems currently in place.

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Compliance Overview (Cont)

Mercury Training

- This training identifies specific elements to the Mercury Storage and Transfer Program and CAPP requirements to ensure personnel entering HWAD are trained and made aware of the following:
  - *Internal Operating Procedures (IOP's) and Safe Work Practices (SWP) for the Mercury Storage and transfer programs are in place and strictly adhered to;*
  - *Process by which changes are managed and evaluated shall be documented through the Management of Change Standard Procedure (SOC.EMP.HG.0007).*
  - *Hazards associated with the storage, transfer, and inspection operations;*
  - *Maintenance Plans and schedules for containerized mercury support equipment, facilities and the Mobile Mercury Transfer Station;*
  - *Standing Operating Procedures (SOP), Internal Operating Procedures (IOP) and Quality Plans (QP) that are under the requirements of the Chemical Accident Prevention Program or CAPP and as such pursuant to Nevada Administrative Code (NAC) 459.95418 the Owner/Operator of a facility with a process that is subject to the CAPP regulations shall provide training;*
  - *Required Documentation can be found on the "G" Drive and are;*
  - *Reviewed Annually per the Control of Documents SOC.QP.QMS.0001 procedure.*

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Compliance Overview (Cont)

Mercury Training

- The Mercury Training Plan:
  - *Human Resources – General Awareness*
    - Compliance training (annual)
    - New Hire training
      - Human Resources will retain these records
  - *Shop Supervisor – Site Specific*
    - IOP's relative to Mercury (annual)
      - Base Operations DCA will retain these records
  - *Environment Office – 3 Year Overview*
      - Base Operations DCA will retain these records

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Process Overview

Mercury Training

- Defense Logistics Agency Strategic Materials (DLA Strategic Materials) is the custodian of the national stockpile of mercury, which by now, you know is located at the Hawthorne Army Depot (HWAD). At the direction of DLA Strategic Materials, the mercury inventory currently stockpiled at HWAD will be transferred from the existing 76-lb flasks to 1-MT containers in a purposely constructed facility called the Mobile Mercury Transfer System (MMTS).

- The MMTS is mobile and could be located adjacent to any or all of the HWAD warehouses that currently store the existing mercury flask stockpile. The MMTS is placed adjacent to Building 110-66, to re-containerize inventory in that warehouse. To minimize costs and downtime, the MMTS is expected to remain in its current location until the entire mercury stockpile has been transferred from the existing 76-lb flasks to 1-MT containers totaling 128,000 flasks throughout 14 buildings in the 110 group.

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Process Overview (Cont)

Mercury Training

- Why Transfer…….
  - *The stockpile contains 128,000 mercury flasks that are over 40 years old.*
  - *Long term storage integrity of the mercury stockpile.*
  - *Drum inspection of 236 flasks appeared to look old but were able to contain the mercury.*
  - *Even though the flasks are suitable for containing the mercury for 40+ years. The welds are of lower quality compared with the state of the art today.*
  - *During the inspection a low percentage did show small droplets of mercury, but well below action levels.*
  - *The flasks stored in airtight drums limits the presence of mercury vapors in the warehouse.*
  - *Four six-pack trays containing 6 flasks and one six-pack tray containing 5 flasks are required to fill an MT container; the total batch for transferring mercury is 29 flasks into an MT container.*

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Process Overview (Cont)

Mercury Training

- *A re-sealable bag is placed in each six-pack flask space prior to placement of the flask in the six-pack. This is a contamination control measure.*
- *A drum containing six (6) mercury-filled flasks weighs approximately 550 lbs.*
- *The presence of loose mercury is expected to be a rare event; however, each drum must be carefully inspected for mercury prior to flask removal. Portable lights are used in conjunction with cart-mounted portable s*

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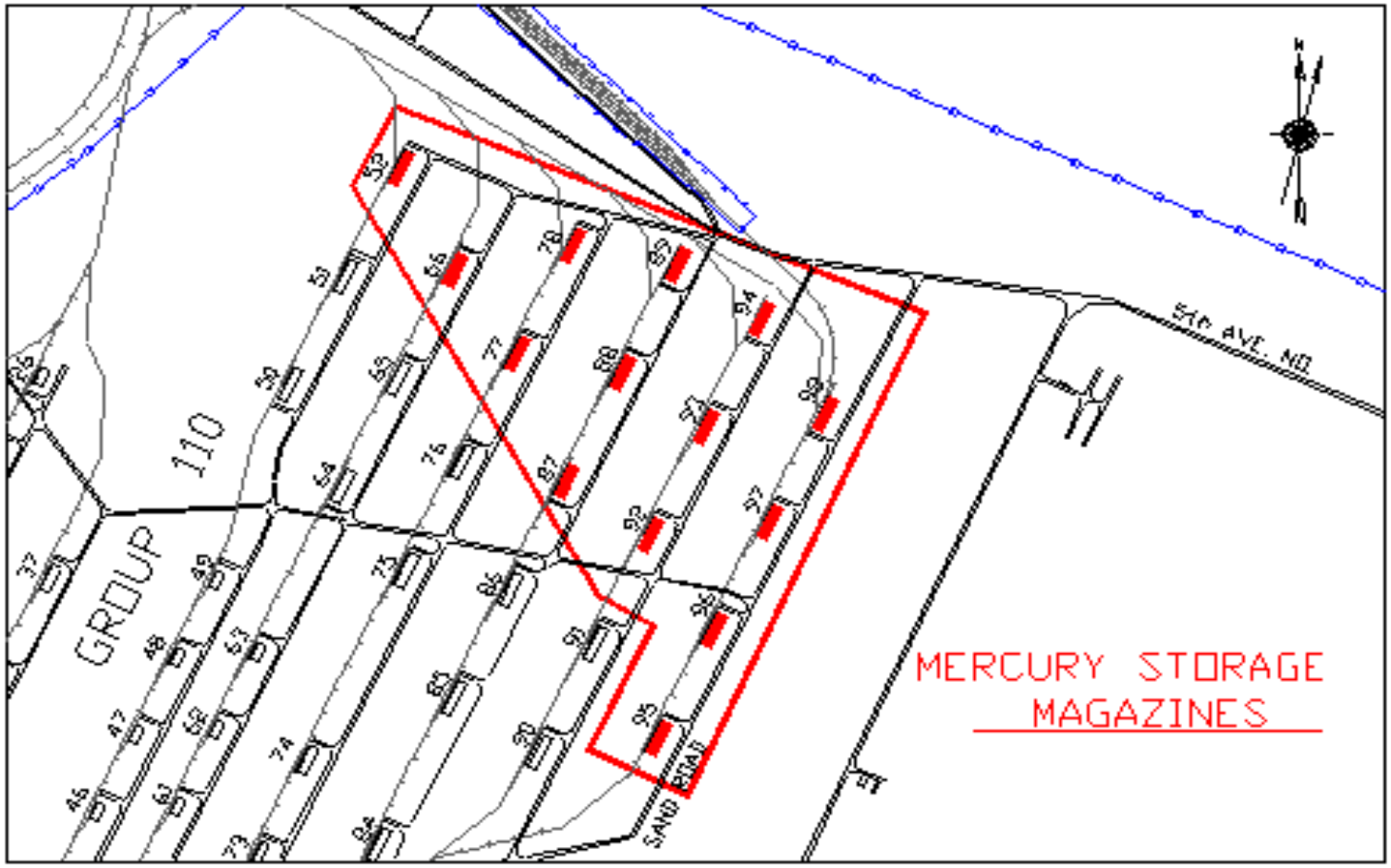
Process Overview (Cont)

Mercury Training



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Process Overview (Cont)

Mercury Training

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Chemical Accident Prevention Program Elements

Mercury Training

- CAPP Elements Including:
  - *Facility and Substance Information*
  - *Process Safety Information*
  - *Process Hazard Analysis*
  - *Standard Operating Procedures*
  - *Training Program*
  - *Mechanical Integrity Program*
  - *Management of Change*
  - *Pre-Startup Safety Review*
  - *Verification of Audit Compliance*
  - *Incident Investigation Program*
  - *Employee Participation Program*
  - *Contractor Program*
  - *Emergency Response Plan*

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An Overview of Relevant CAPP-Specific Operating Procedures

Mercury Training

- TIER I
  - *QP.EMS.HG0001 – Management System and Implementation Plan Chemical Accident Prevention Program (CAPP).*
  - *QP.EMS.HG0002 – Process Safety Information Standard Procedure.*
  - *QP.EMS.HG0003 – Process Hazard Analysis Procedure for Mercury Storage and Transfer Program and the CO2 Fire Suppression System.*
  - *QP.EMS.HG0004 – Standard Operating Procedure Program for the Mercury Storage and Transfer Program.*
  - *QP.EMS.HG0006 – Mechanical Integrity Procedure for the CO2 Fire Suppression System.*
  - *QP.EMS.HG0007 – Management of Change.*
  - *QP.EMS.HG0008 – Pre-Startup Safety Review.*
  - *QP.EMS.HG0009 – Compliance Audit Program.*
  - *QP.EMS.HG0010 – Incident Investigation.*
  - *QP.EMS.HG0011 – Employee Participation.*
  - *QP.EMS.HG.0013 - Contractor Program for the Mercury Transfer Program*

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An Overview of Relevant CAPP-Specific Operating Procedures

Mercury Training

- TIER II
  - *2014-MMTS-ES Executive Summary Procedure.*
  - *2014-MMTS-1 thru 27, (Specific to DLA personnel)*
  - *QP.EMS.HG0005 – Mercury Storage Site Inspection.*
  - *QP.EMS.HG.0012 – Waste Analysis & Characterization Plan for the Mobile Mercury Transfer System (MMTS).*
  - *ISS.IOP.EMB.1300 – Refrigeration and Maintenance Plan.*
  - *QP.BOP.EMD.1301 – Base Operations Start Up/Shut Down and CO2 Tank Fill/Refill Procedure.*
  - *BOP.IOP.EMB.1302 – Electrician Maintenance Plan.*
  - *ISS.IOP.EMB.1303 – Electric Technician Mercury Storage.*
  - *BOP.IOP.CAP.0001 – Carbon Dioxide Line Breaking Procedure for the Mercury Storage Warehouses.*
  - *QP.EMS.HG.0005 – Mercury Storage Site Inspection.*
  - *FES.IOP.FFO.0017 – 110 Hg Storage Warehouses with CO2 Fire Suppression Response & Manual Activation System.*

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An Overview of Relevant CAPP-Specific Operating Procedures

Mercury Training

- TIER II (Continued)
  - *FES.IOP.FST.0015 – Test, Inspection & Maintenance of CO2 Fire Suppression 110 Hg Storage.*
  - *FES.IOP.FFO.0019 – Mercury Monitoring and Response.*
  - *SOC.OHS.SP.0002 – Safety Hot Work Permit Chapter 10.*
  - *SOC.OHS.SP.0002 – Lock Out/Tag Out Chapter 21.*
  - *SOC.OHS.SP.0002 – Confined Space Program Chapter 20.*
  - *QP.HRD.TT.0005 – Master Training Plan.*
  - *SOC.QP.EMP.HG.0002 - Mercury Training Pan.*
  - *HWAD/SOC Maintenance Plan for Mercury Storage and Transfer.*

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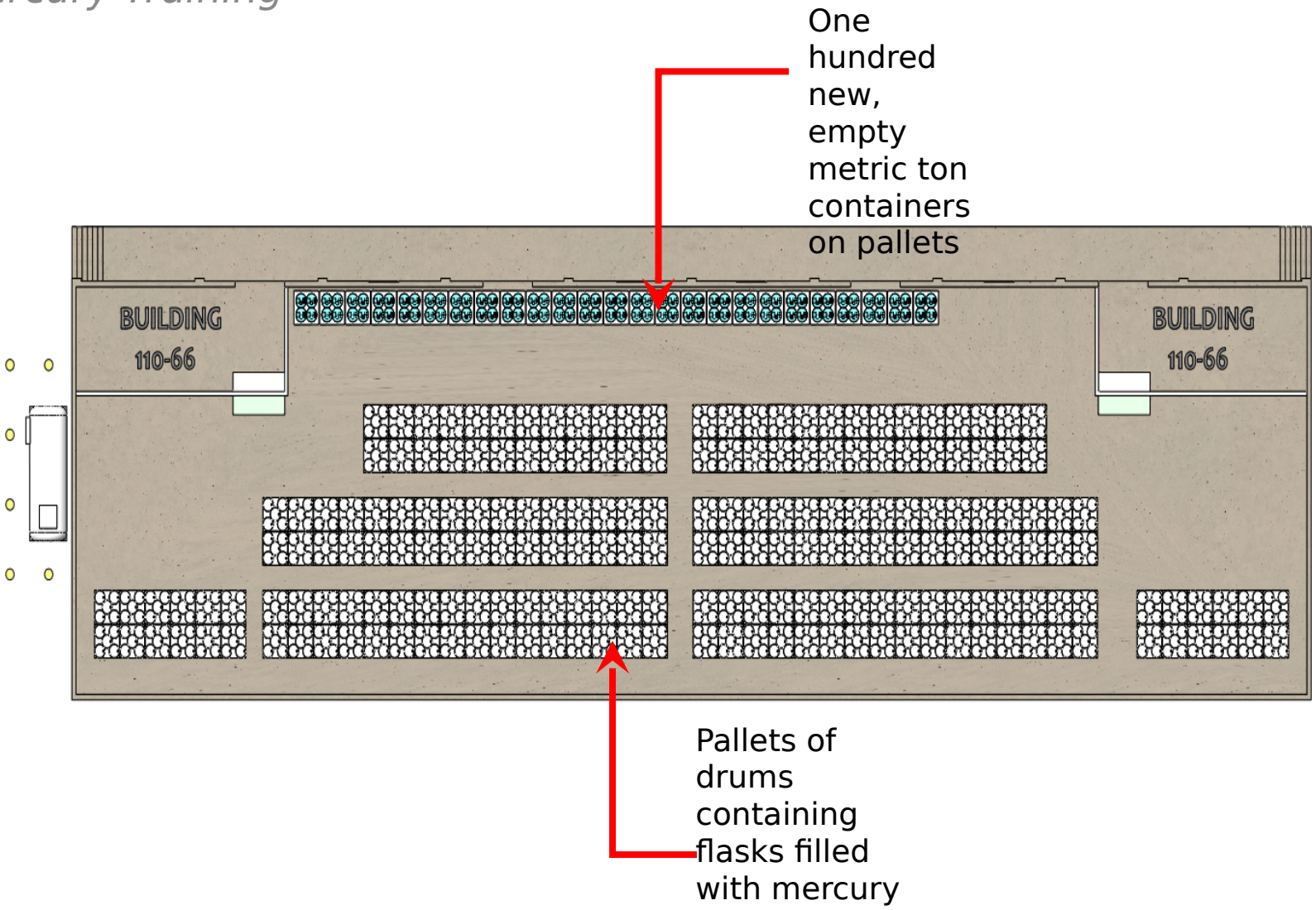
Mercury Storage Concept of Operations/Layout

Mercury Training


One hundred new, empty metric ton containers on pallets
BUILDING 110-66
BUILDING 110-66
Pallets of drums containing flasks filled with mercury

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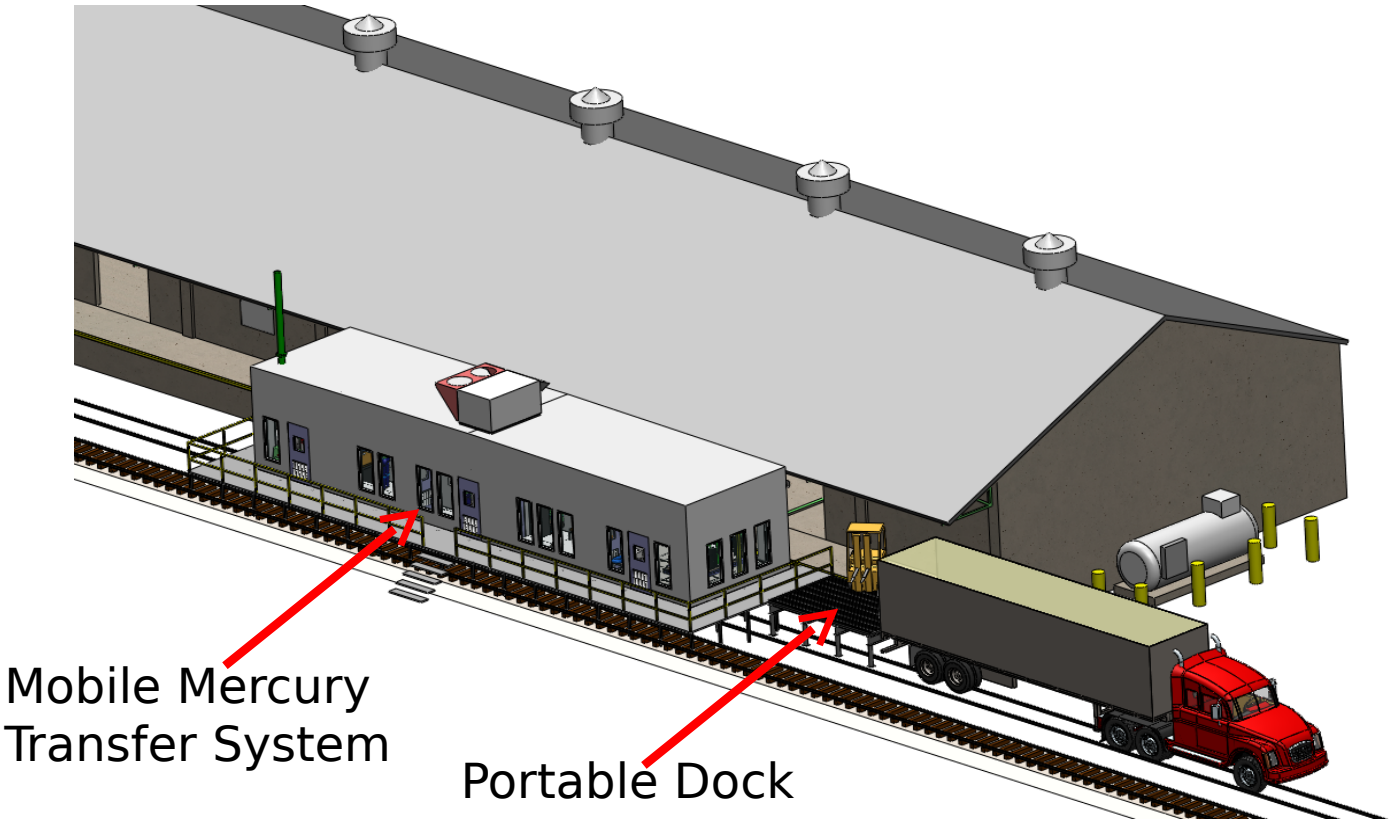
Mercury Storage Concept of Operations/Layout (Cont)

Mercury Training

Mercury Storage Concept of Operations/Layout (Cont)

Mercury Training



Building 110-66

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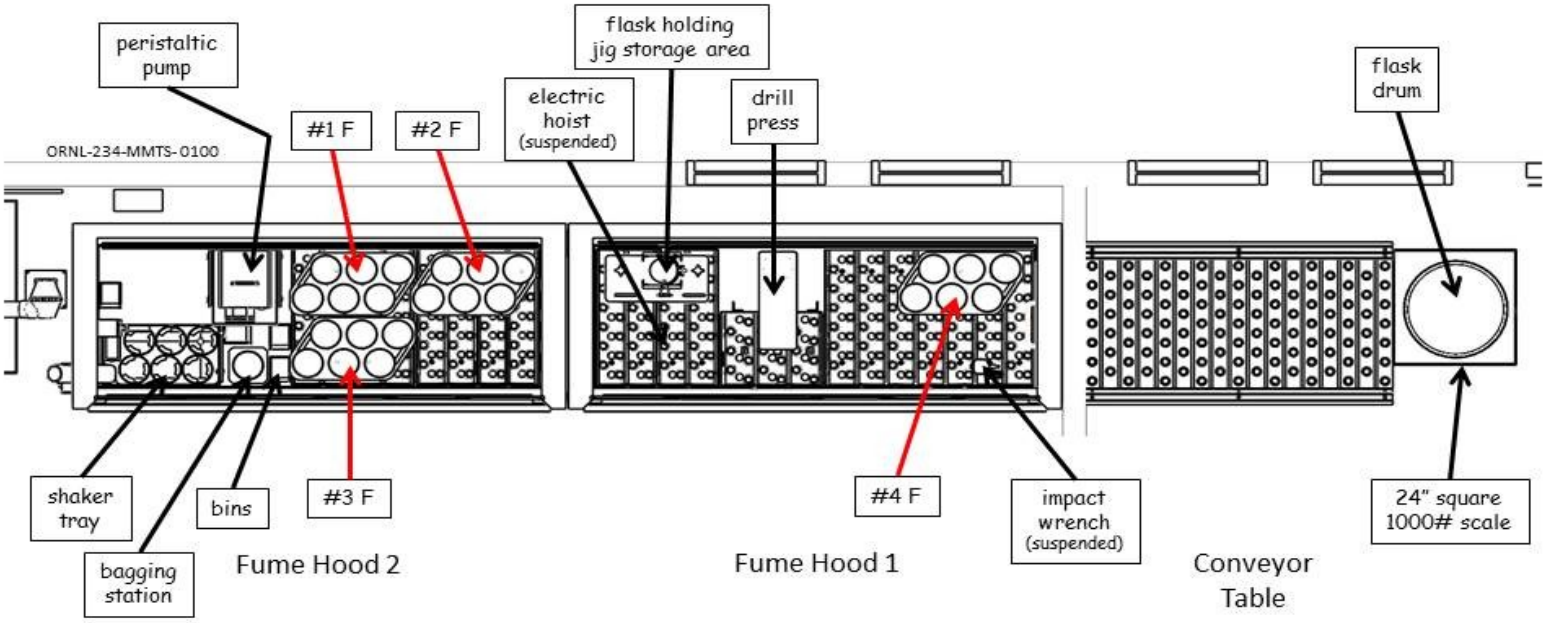
The Location of Equipment and Instrumentation

Mercury Training



This drawing shows the Conveyer Table, Fume Hood Stations 1 and 2, and equipment located in the fume hoods. The four flask trays shown are the maximum number of trays that can be under the controlled environment of the hoods. Note in this arrangement the "F" designation for the trays means they contain flasks full of mercury.

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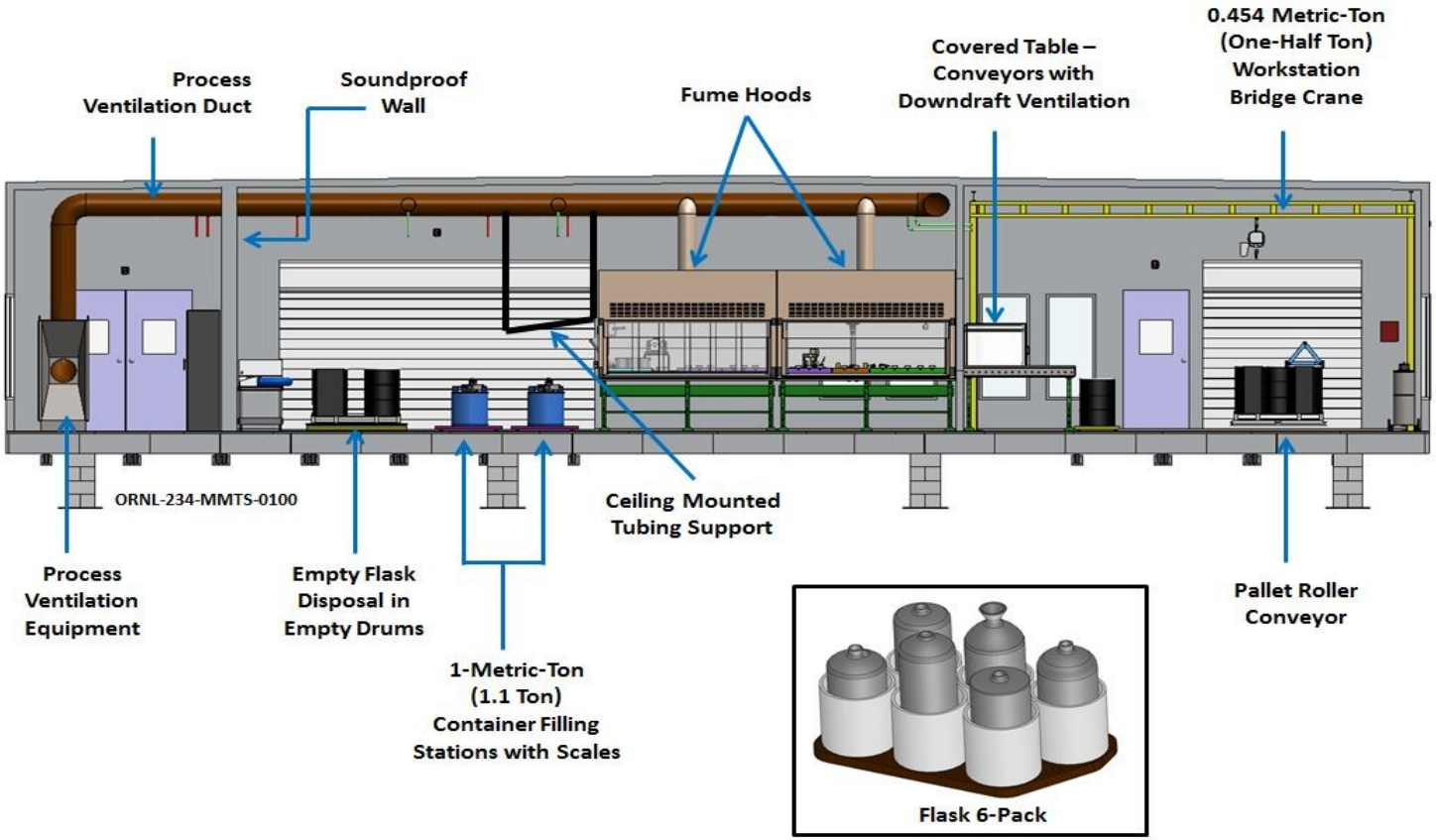
The Location of Equipment and Instrumentation (Cont)

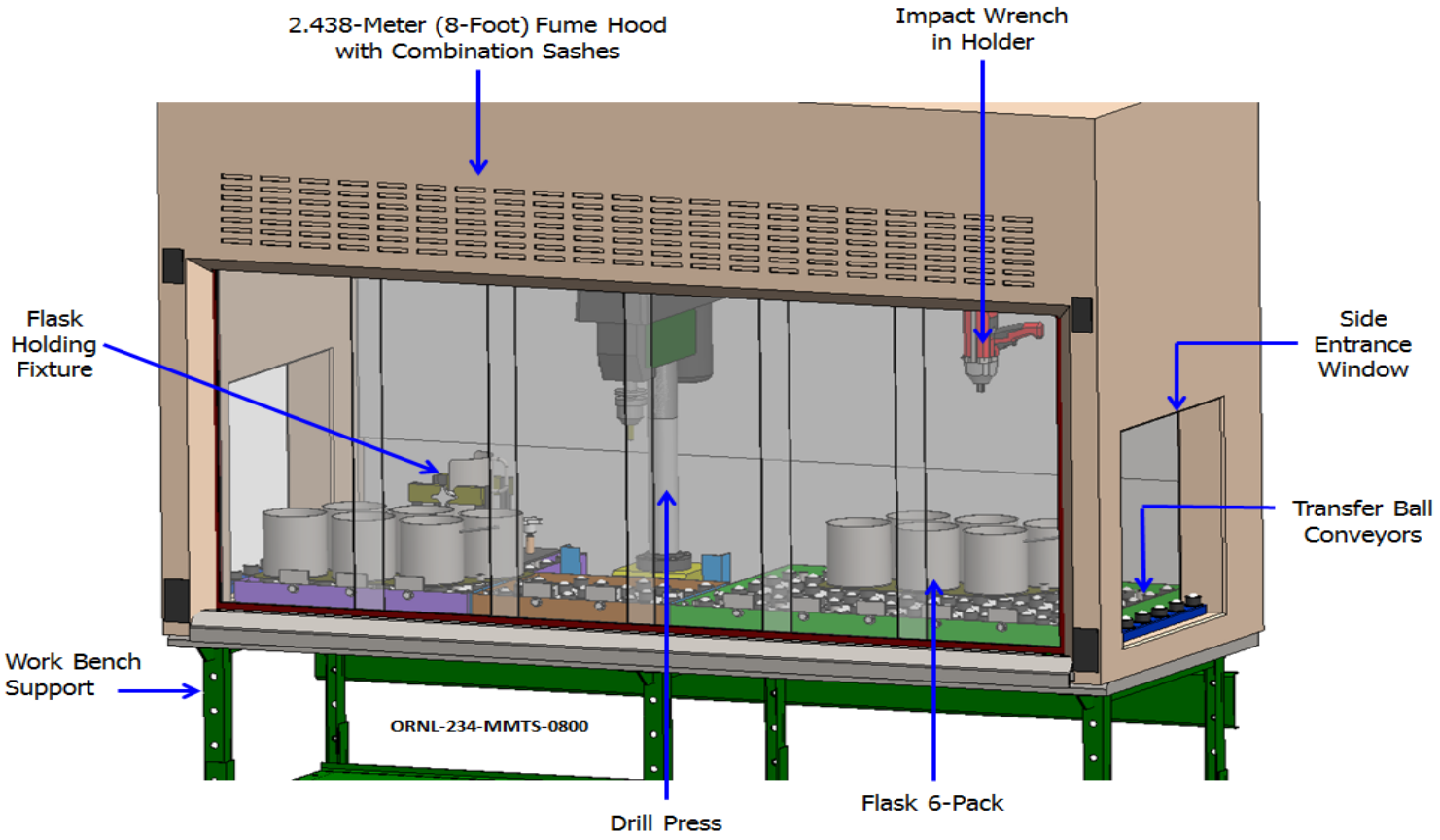
Mercury Training


Process Ventilation Duct
Soundproof Wall
Fume Hoods
Covered Table – Conveyors with Downdraft Ventilation
0.454 Metric-Ton (One-Half Ton) Workstation Bridge Crane
ORNL-234-MMTS-0100
Ceiling Mounted Tubing Support
Process Ventilation Equipment
Empty Flask Disposal in Empty Drums
1-Metric-Ton (1.1 Ton) Container Filling Stations with Scales
Pallet Roller Conveyor
Flask 6-Pack

General Arrangement of Work Stations

The Location of Equipment and Instrumentation (Cont)

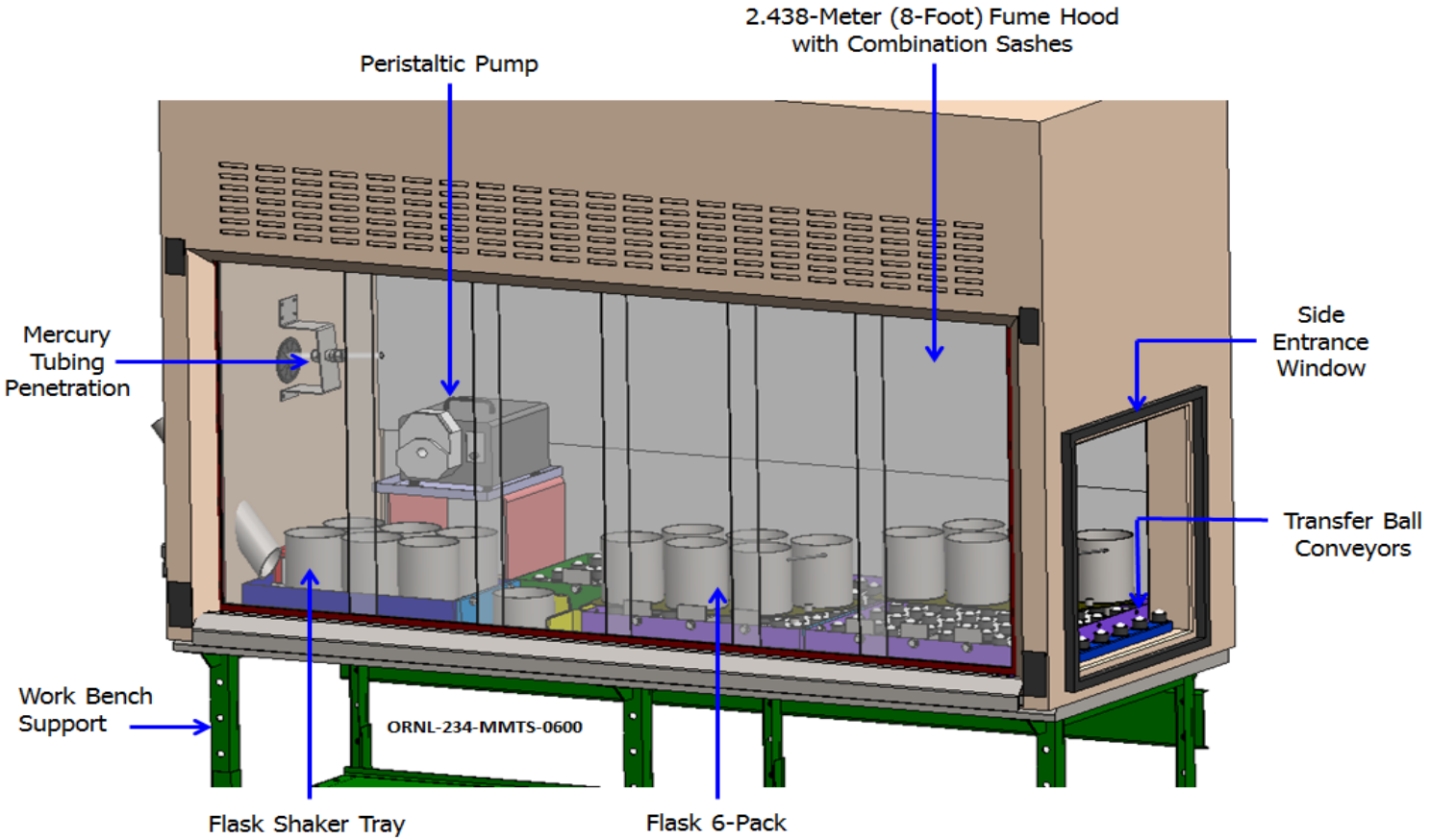
Mercury Training



Fume Hood 1

The Location of Equipment and Instrumentation (Cont)

Mercury Training



Fume Hood 2

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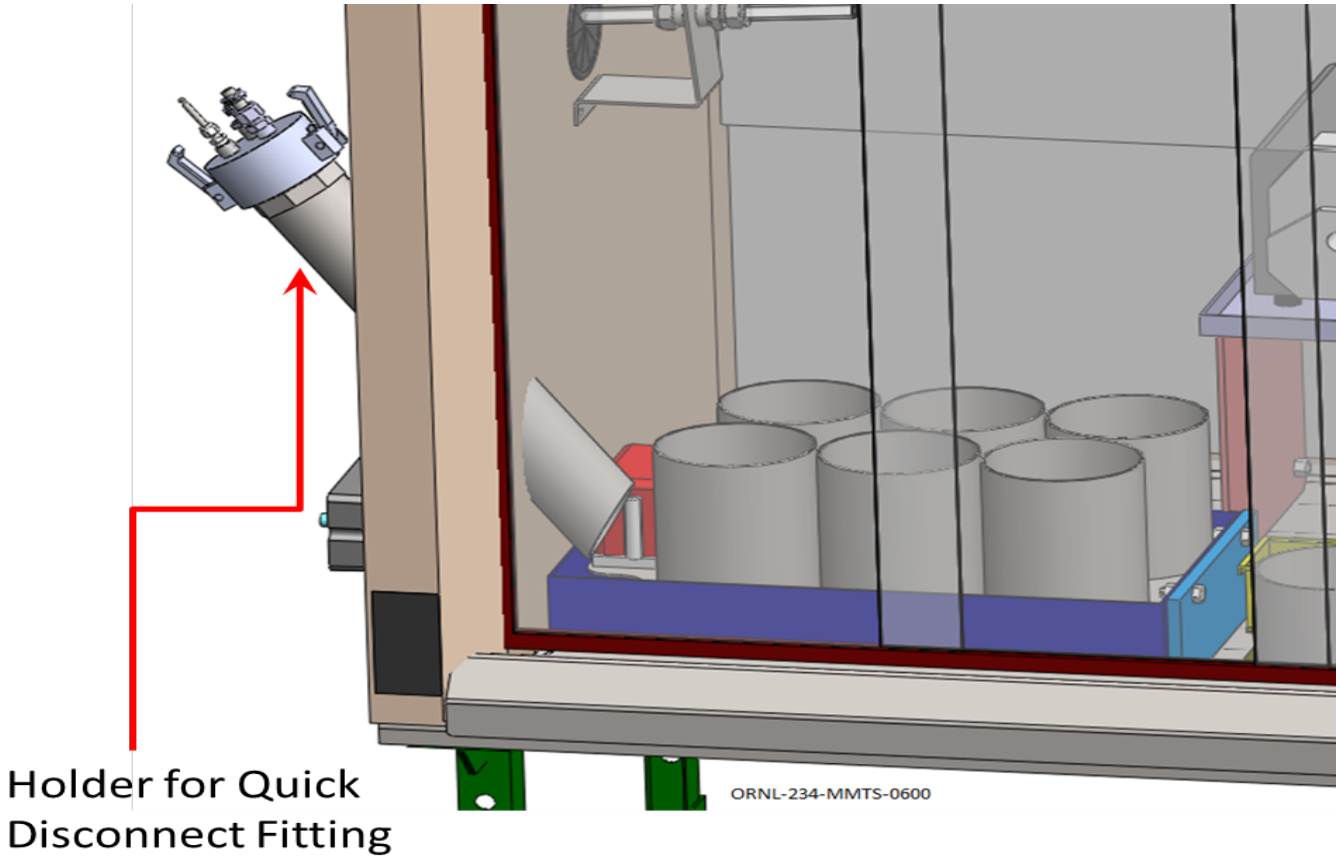
The Location of Equipment and Instrumentation (Cont)

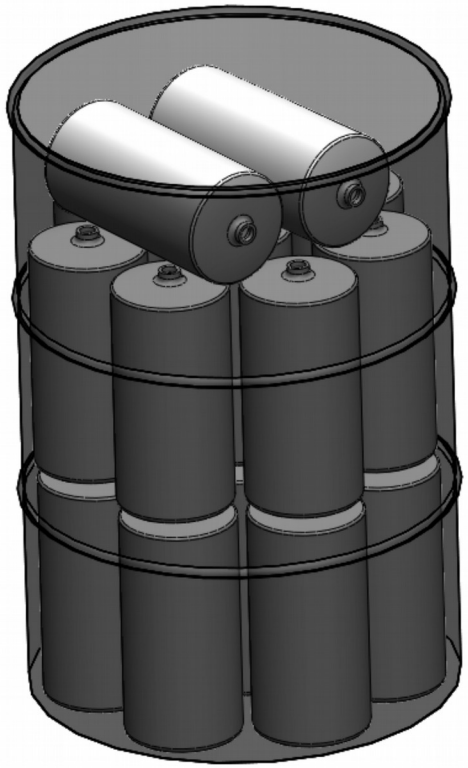
Mercury Training



Storage of the Quick Disconnect Transfer Fitting

The Location of Equipment and Instrumentation (Cont)

Mercury Training



T-5 flasks
(most common in stockpile – 56,845 flasks)
8 flasks placed vertical
and
8 flasks placed vertical
(assumed no "cupped" bottom)
and
2 flasks placed horizontal

18 flasks per drum

T-5 flasks (most common in the DLA stockpile – 56,845 flasks) – 8 flasks placed vertical and 8 flasks placed vertical (assumed no "cupped" bottom) and 2 flasks placed horizontal – 18 flasks per drum

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The Location of Equipment and Instrumentation (Cont)

Mercury Training

- Read the PM Job Plans – sent to your shops with training sheet.
- Review the Operating Manuals that have been copied for your use.
- Coordinate with the DLA Site Manager at the MMTS to schedule the PM visit.
- Remove **Jewelry** and **Watches**.
- No **Food**, **Drink**, of **Gum** in **MMTS**.
- Sign in at each trailer before entering, they are **“Controlled Access”** facilities.
- If changing out the air system filters, the dirty filters are to be left at the MMTS site for disposal.
- General guidelines – DLA will suspend operations during SOC maintenance procedures. It is critical to coordinate with the Facilities Manager when responding to Trouble Calls.
- Ensures maintenance personnel are aware of the location of equipment and familiar with their maintenance procedures.

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Specific Health and Safety Aspects for Mercury (What is it?)

Mercury Training

- Chemical symbol: Hg
- Atomic weight: 200.59
- Density: 13.6 g/cm3 (iron: 7.9 g/cm3, lead: 11.3 g/cm3, gold: 19.3 g/cm3)
- One of the rare elements to be liquid at room temperature
- Emits mercury vapor
- Vaporization increases with temperature, surface area, and agitation
- Metallic form is insoluble in water
- Forms alloys with metals (except iron, steel, and platinum)
  - *Elemental Mercury Vapor*
  - *Toxic*
  - *Invisible, odorless, and tasteless*
  - *Biologically harmful*
  - *Soluble in fat*

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Specific Health and Safety Aspects for Mercury

Mercury Training

- The most severe health effects associated with chronic mercury exposure are related to long-term exposures to vapors at levels above the OSHA permissible exposure limit (100,000 ng/m3).
- The level of mercury vapor is expected to stay well below the level to create a health concern to employees.
- Employees handling mercury should perform the following actions:
  - *Use PPE appropriate for the work task; wash thoroughly after handling flasks; avoid breathing mercury vapors at concentrations above the HWAD action level (25,000 ng/m3); do not eat or drink while handling mercury containers; remove any contaminated clothing immediately; report all mercury releases promptly .*
- Don't Panic!
  - *Even though mercury is harmful, with correct protective measures, personnel exposure is minimal. For example ORNL worked with flasks contaminated externally with small droplets of mercury and levels were kept well below action levels.*
- MSDS for Mercury – Take one before you leave.

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Emergency Operations and Emergency Shut Down

Mercury Training

- A reportable spill is any spill over 1 pound of Mercury that is introduced into the environment which has to be reported the National Emergency Response Center
- Specific Emergency Operations and emergency shut down of equipment at the (MMTS Mercury Mobile Transfer Station) will be accomplished by trained site specific DLA operators. FES will be informed of any emergency conditions that is going on in the MMTS.
- FES will only be requested for conditions where mercury is spilled and introduced to the environment and requires spill mitigation and cleanup.
- Evacuation Instructions:
  - *Notify all occupants there is an emergency*
  - *Exit at the nearest designated exit*
  - *Ensure everyone has evacuated*
  - *Evacuate from warehouse or MMTS upwind, 150' (Check wind sock for direction of wind)*
  - *Ensure all occupants are accounted for and meet senior fire official to relay information regarding incident.*

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Safe Work Practices of Mercury

Mercury Training

- The “Lock-Out/Tag-Out” defines the process for ensuring that no employees or contractors are exposed to hazards associated with a release of hazardous energy or deficiencies with, or inadequacies of control of hazardous energy in buildings and grounds at HWAD. (29 CFR 1910.147)
  - *The Lock-Out/Tag-Out station is at bldg. 39, Maintenance Control office.*
  - *They will issue the Locks, Hooks, Tag-Out Cards and Ties; and document;*
    - Lock Number;
    - Date the lock is checked out;
    - The Location and/or the location of the Equipment being Locked out;
    - Date the lock was/is returned; and
    - Employee name and badge number

Note: Review your job specific IOP’s and JSA’s relative to the Mercury Storage and Transfer Program before “Lock-Out/Tag-Out” is performed.

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Safe Work Practices of Mercury

Mercury Training

- The “Safety Hot Work Permit” process at HWAD has been updated to include the Mercury Storage Warehouses, MMTS, and Nevada Administrative Codes. (NAC 459.95433)
  - *Issued and approved by Safety and Fire & Emergency Services.*
  - *Completely fill out the permit to included, but not limited to;*
    - Name and Badge Number;
    - Work Order number;
    - The dates which are authorized for hot work;
    - The location;
    - Equipment Requirements and/or Heat Producing Devices
    - The object on which hot work is to be performed; and
    - Keep the permit on file until completion of the hot work.

Note: Review your job specific IOP’s and JSA’s relative to the Mercury Storage and Transfer Program before “Hot Work” is performed.

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Safe Work Practices of Mercury

Mercury Training

- The “Confined Space Program” is established to control entry to permit required and non-permit required confined spaces, this covers all employees and subcontractors. (29 CFR, Part 1910, Section 146)
- Issued by Safety and approved by the Fire & Emergency Services.
  - *Ensure employees and subcontractors that enter confined spaces have adequate training and equipment for the particular confined space that will be entered. “Safety is the utmost concern and will not be violated for any reason”.*
  - *General permit information to included, but not limited to;*
    - Type of Space Hazard – Flammable, Toxic, Electrical etc.;
    - Equipment Requirements;
    - Personal Protection Equipment;
    - Respirator Protection; and
    - Who’s Authorized

    Note: The permit is only valid for the date and time it was issued.

Note: Review your job specific IOP’s and JSA’s relative to the Mercury Storage and Transfer Program before you enter a “Confined Space”..

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Management of Change(s)

Mercury Training

- Management of Change - Standard Procedure (SOC.EMP.HG.0003) for the Mercury Storage Program to comply with the NDEP – CAPP and
- Procedures are written to evaluate and document the impacts on safety of proposed changes to:
  - *Processes*
  - *Organizational structure or staffing levels*
- Replacements in kind are also subject to review under the management of change process.
- Changes may be implemented only after formally documented evaluation, approval, and training are completed.
- All workers potentially impacted by the change must be trained
  - *Examples:*
    - Inspection Process.
    - The DLA Strategic Materials will assume the SOC commodity inspection process.
    - Mercury Commodity inspections will decrease from monthly to quarterly.

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Management of Change(s)

Mercury Training

- Test: Verify that employees understand training (75% = minimum passing test score).
- Each question is worth 8.5%

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